Amendments to the Drawings:

Attached are two sheets of new drawings, comprising new FIGS. 3 and 4.

REMARKS/ARGUMENTS

Reconsideration of this patent application is respectfully requested in view of the foregoing amendments and the following remarks.

The claim are 1-13. Claims 1 and 5 have been amended to more clearly define the invention. Support for the claim amendments may be found, *inter alia*, in the specification as filed at page 12, second paragraph and at page 14, last paragraph. Claim 14 has been cancelled without prejudice.

Claims 1-4 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,609,410 to *Axe et al.* Claims 5, 6, 7, 10, 11, and 12 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Axe et al.* in view of U.S. Patent No. 4,383,450 to *Pringiers et al.*

Claim 9 has been rejected under 35 U.S.C. §103(a) as unpatentable over *Axe et al.* in view of *Pringiers et al.* and further in view of U.S. Patent No. 6,161,422 to *Thomas et al.* Claim 8 has been rejected under 35 U.S.C. §103(a) as unpatentable over *Axe et al.* in view of *Pringiers et al.* and further in view of U.S. Patent No. 6,755,087 to *Clegg*. Claim 13 has been

rejected under 35 U.S.C. §103(a) as unpatentable over *Axe et al.* in view of *Pringiers et al.* and further in view of U.S. Patent No. 5,739,411 to *Lee et al.*

The rejections are respectively traversed.

Independent claims 1 and 5 have been amended to more clearly define the invention. In particular, claim 1 has been amended to recite a method including the steps of:

> *setting a sample body on a force measurement device comprising a force transducer adapted to vibrate upon an impact;*
>
> *deforming said sample body by impacting said sample body with a weight, wherein said impacting causes said force transducer to product a vibration;*
>
> *superimposing said vibration of said force transducer onto said force signal;* and
>
> *detecting a damping behavior of said vibration by said sample body*

Likewise, claim 5 has been amended to recite a device including:

> *a force measurement device adapted to vibrate upon an impact;*
>
> wherein
>
> *a vibration of said force measurement device is superimposed onto said force signal and a damping behavior of said vibration is detected by the sample*

body.

A distinguishing feature of the method and device for measuring a plasticity of a material as recited in independent claims 1 and 5 is that the vibrations induced in the force measurement device by the impact of the weight on the sample body are intentionally used to record how the material being tested damps these vibrations. As recited, these vibrations are superimposed onto the force signal.

The occurrence and damping of these vibrations are an essential component of the force signal. As recited in claim 1, a force transducer may be used to contribute to the required inherent vibrations. This feature is neither disclosed nor suggested in any of the references of record, either alone or in combination.

Moreover, the method and device for measuring a plasticity of a sample material as recited in amended claims 1 and 5 of the present application include numerous advantages which are not achieved by the methods or devices described in the cited references.

In particular, a method and device as recited in claims 1 and 5 is especially useful for determining the suitability of a

plastically deformable material (preferably a ceramic mass) for a subsequent shaping process, for example extrusion, rolling or pressing. This method and device may be used to evaluate the influence of additives on the plastically deformable material. Changes in water content, grain size spectrum or other deviations relevant to the subsequent shaping process can be quickly recognized.

In addition, the material properties of interest may be characterized quickly and comprehensively with only a single measurement, wherein the measurement takes into consideration all of the deformation velocities from impact velocity to rest.

A method and device as recited in the amended claims permits the detection of the flow limit (first rise in accordance with the build-up of elastic tension up to the occurrence of flow), the flow itself (second rise) and the elastic components during flow (superimposed vibrations) which are illustrated in a measurement curve so as to be readily differentiated. The recognition of the elastic component of the sample is especially important for extrusion, wherein reverse expansion can occur after the material exits the mouthpiece. This reverse expansion results in dimensional deviations from the mouthpiece geometry and accordingly must be known and constant in order to maintain a

required tolerance of the extruded part.

The progression of the measurement curve is processed by a computer and value ranges for production release may be determined using this method. In addition, a sample geometry corresponding to the particular requirements can be freely selected within a specific framework. The sample is freely visible during the entire test period so that any incorrect measurements may be immediately recognized.

The above described features and advantages are nowhere disclosed or suggested in the references of record.

Axe et al. relates to a method and device which are completely different from the method and device as recited in amended claims 1 and 5, both with respect to the sample material tested and the sample shape. The method and device according to *Axe et al.* are for testing the <u>elastic</u> properties of a <u>finished</u> material, not the plastic properties of a mass relevant to a subsequent processing of the material, for example a subsequent shaping process, such as extrusion or rolling.

Moreover, *Axe et al.* fails to precisely define the impact weight or describe the guidance of the falling mass. The sample

according to the method and device described in *Axe et al.* is installed between two platens, wherein the upper platen changes the impulse on the sample as a result of its own mass inertia. The path measurement takes place between the upper platen and a base of the sample holder. This method differs substantially from the method as claimed in the present application, wherein a path signal is generated based on the movement of the falling weight.

A significant disadvantage of the device described in *Axe et al.* is that the sample carrier plate is guided by means of a bolt, resulting in the possibility of errors caused by adhesion friction and slide friction. The alternative sample holders shown in FIGS. 5, 6 and 7 of *Axe et al.* cannot be used for measuring the plasticity of a material as recited in the pending claims and accordingly, are not relevant thereto.

The deficiencies of the primary reference (*Axe et al.*) are not remedied by any of the secondary references of record.

Pringiers et al. describes a method, the primary use of which is for determining the elastic and viscous properties (modulus of elasticity, loss modulus) of viscoelastic <u>finished</u> materials such as rubber, plastics and thermoplastic rubber-like

materials. The actual target variable in the method according to *Pringiers et al.* is the relaxation behavior which is determined from the modulus of elasticity and the loss modulus.

Elastic and viscous components of the material properties can change in magnitude as a function of the stress frequency (the stress velocity and holding time). In addition, measurement of these properties is frequently determined with oscillating rotation viscosimeters.

In the method according to *Pringiers et al.*, the load is applied by means of a cam, wherein the load increase follows a rising sinusoidal curve determined by the rotational speed of the cam. The stress is kept constant for a period of 10-15 seconds. This method differ significantly from the method and device recited in amended claims 1 and 5, wherein the impulse and deformation velocity decrease over time, due to the <u>properties of the sample being measured</u>.

Moreover, the force sensor in the construction described in *Pringiers et al.* is located above the sample and measures a <u>counter-force</u> of the sample as a function of time. This differs from the method and device as recited in the present application, wherein the measured force is a force which is passed on at the

bottom of the sample.

As described in *Pringiers et al,.* a half-sphere having a diameter of up to 3 mm penetrates into a sample with a path corresponding maximally to the radius of the half-sphere. The sample must have a diameter of at least five times the diameter of the penetrating half-sphere. According to *Pringiers et al.*, a penetration test with a path limited to a maximum of 10% of the sample thickness is preferred. The required limited stressed region of the sample must be configured to be so small as to permit the overall deformation of the sample to be ignored. Again, this method differs substantially from the method and device recited in amended claims 1 and 5, wherein the entire sample is always deformed and thus there is no path limitation as in *Pringiers et al.*

Thomas et al. describes a method and apparatus for measuring the strength of a compressed sand sample. As in the previously described references, the properties of a <u>final</u> state (finished sand mold) are being investigated, in contrast with the method and device as claimed, which relate to the plastic properties of a mass relevant to a subsequent processing of the material. Plastic behavior is not the aim of the measurement conducted according to *Thomas et al.*

The load cell described in *Thomas et al.* is believed to be used only to determine the weight of the compacted sand cylinder. In the subsequent description of the "green sand compression test" in *Thomas et al.*, the load cell is no longer mentioned.

During the "green sand compression test" as described in *Thomas et al.*, pressure is applied to the sample with a hydraulic cylinder. The path up to the destruction of the sample is measured as the essential variable. The aim of this measurement, however, is to record the deformation progression, not the force progression, as in the method and device recited in the pending claims.

Furthermore, the method and apparatus described in *Thomas et al.* use a slowly increasing force, not an impact force as recited in the pending claims. Elastic properties of the sample are detected in *Thomas et al.*, by pulsating the load application and measuring the spring-back behavior (path measurement), not by way of oscillation of the force signal as in the method and device recited in the pending claims.

For the reasons set forth above, the references of record fail to teach or suggest the method as recited in amended claim 1

or the device as recited in amended claim 5. Accordingly, it is believed that the independent claims 1 and 5, as well as claims 2-4 and 6-13 which depend therefrom, are allowable over the cited references.

The Examiner has objected to the drawings as not showing every feature of the invention specified in the claims. Submitted herewith are two additional drawing sheets comprising new FIGS. 3 and 4 and illustrating an embodiment of the invention. The Specification has been amended to make reference to the new drawing figures. No new matter has been introduced.

In summary, claims 1 and 5 have been amended and claim 14 canceled without prejudice. New drawing FIGS. 3 and 4 have been added and the specification has been amended to make reference to the new drawing figures.

In view of the foregoing, it is respectfully requested that the claims be allowed and that this case be passed to issue. Applicant respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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Enclosure(s): Petition under Rules 17 and 136 for one (1) month extension of time (2 copies) and check for $60.00
Two (2) drawing sheets (FIGS. 3 and 4)

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on December 12, 2005.

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